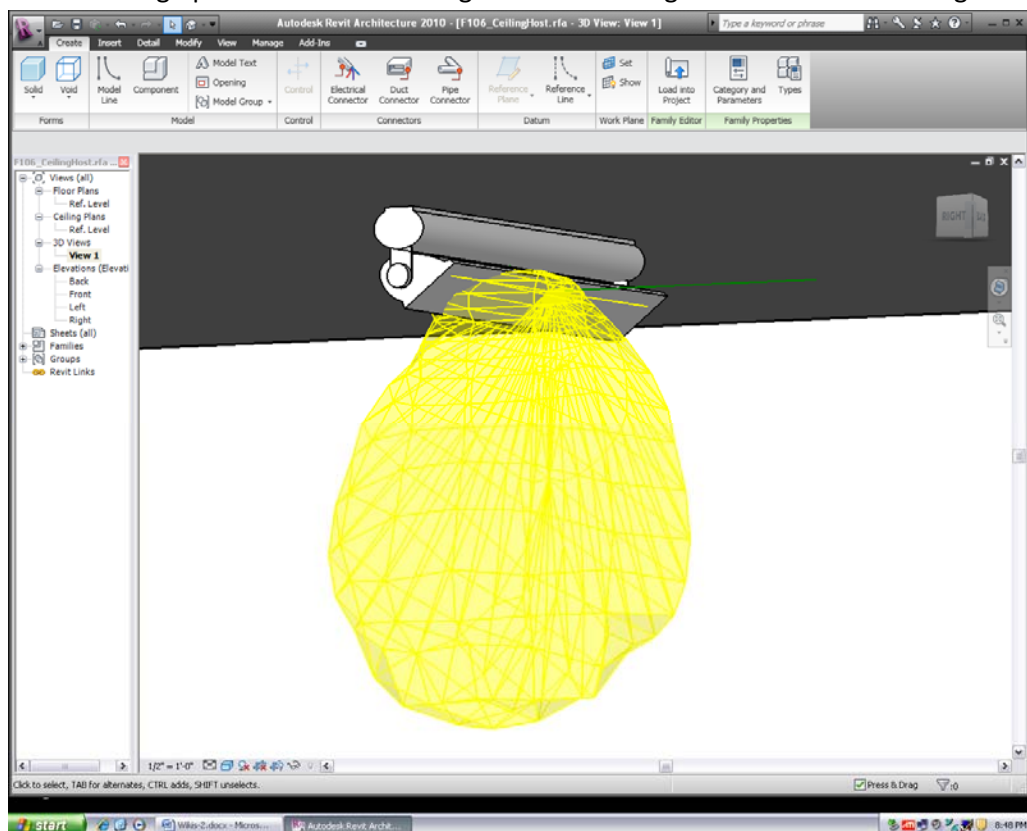


## Creating interchangeable parts through use of the <family type> parameter

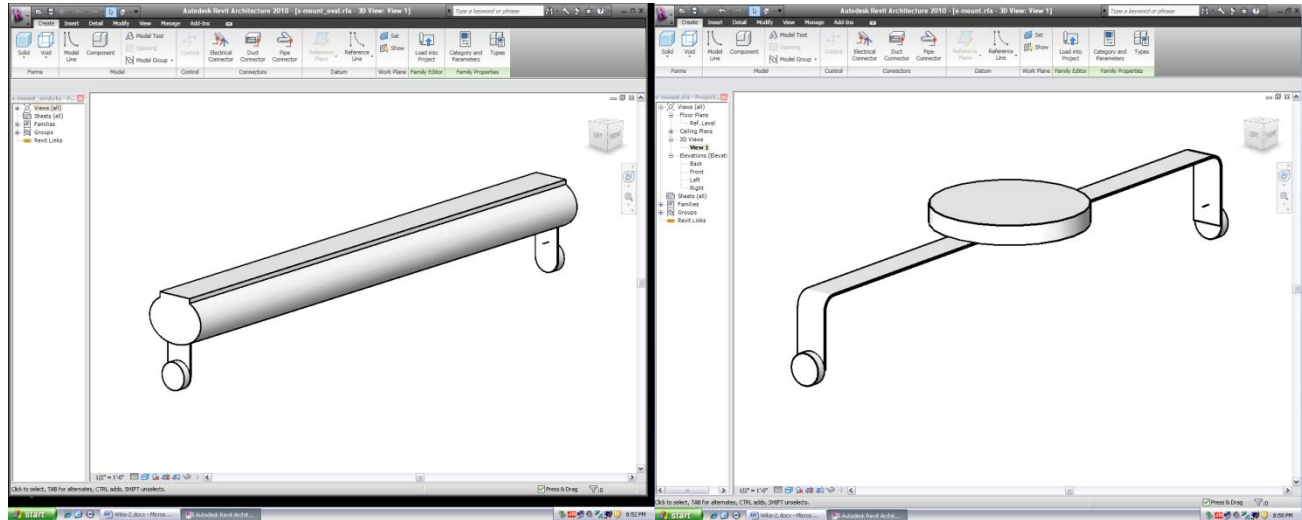
This goal of this tutorial is to cover basic topics and processes of using interchangeable parts within a component family. The purpose of using interchangeable parts lies in the art of family type creation for families that not only modulate parameter values between types but also must switch out components in place of one another as a separate family type. Normally changing the geometry will dictate a separate family. There is one way to get around this and it's through the process of establishing interchangeable parts by applying the <family type> parameter to different sets of hosted geometry within one family that will swap in and out for each other. An example of this, which will be used for this tutorial, is integrating multiple mounting geometries for a light fixture into one family that is controlled through the family types.

The basic theory for this process is understanding the difference between a nested component family and a host family. A host family is the main family, in this case the light fixture family that will eventually be loaded into a project. This can include the geometry that will never change from type to type. The nested component families will be the geometries that can interchange with one another corresponding to different types. In the case of a light fixture with multiple mounting options, the different mounting options would be modeled as separate families and then nested into the host family. A family parameter will be applied to these nested families to facilitate the interchange.

Let's proceed with the example. The family is an indirect wall washing light fixture with a ceiling mount. The mounting option is what will change. Here's an image of what we're working with.

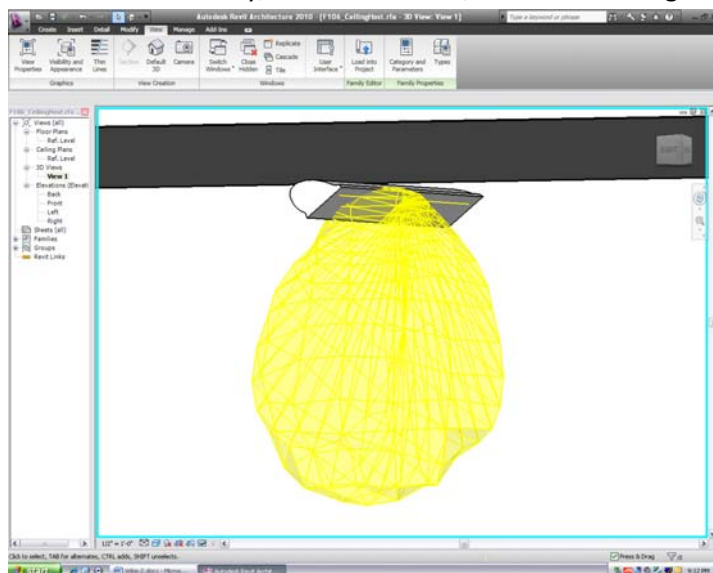


In this family the only geometry that exists in the host family is the reflector. To create different combinations for family types the mounting geometries and light source + ies file geometries are nested components. We will focus on the mounting geometries. Below are images of both mountings. One is an Oval mount and one is a yoke mount.

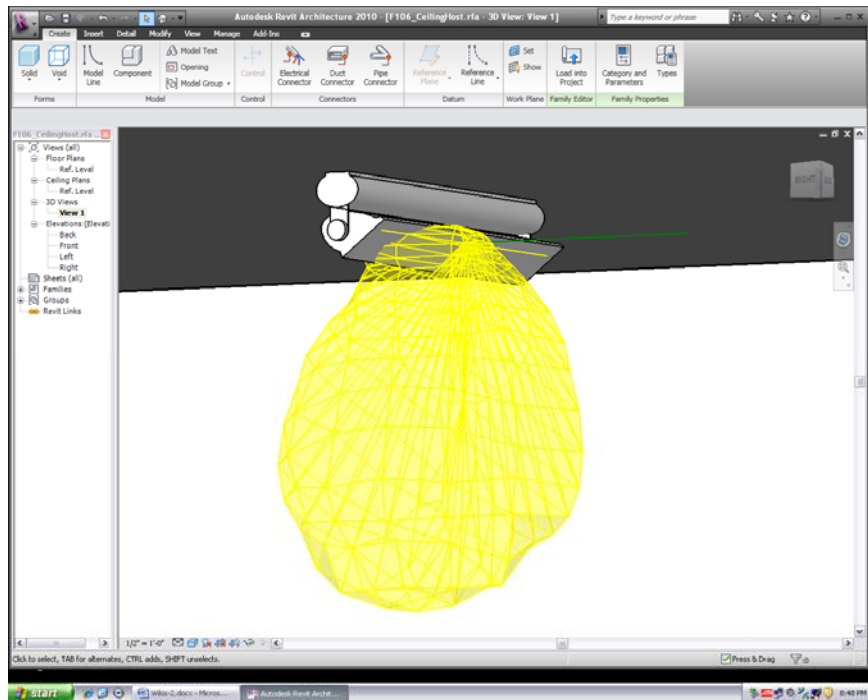


These families should be modeled separately, but done in a way so that when each is imported they are already in place or does not need to be moved much. Also they should be of the same category as each other and different from the host file. This property can be changed in the category and parameters dialog. This takes some coordination between the families and does take some knowledge of work-plane based families, but is not necessarily the issue at hand. It is suggested that one builds each component from the same template reference plane, like the Ref. Level- 0'-0" that exists in most templates.

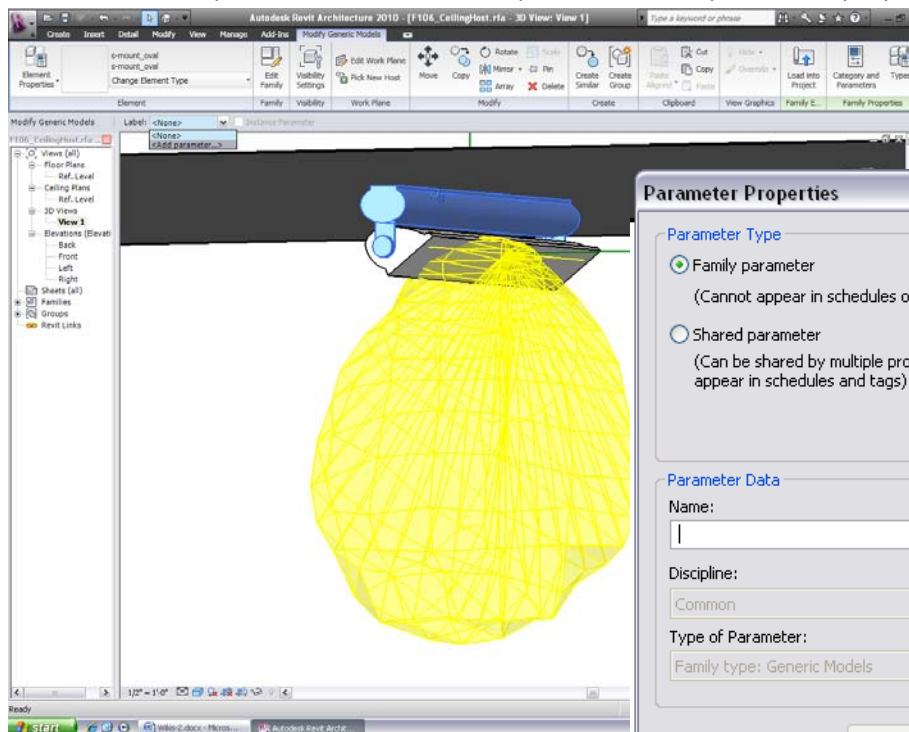
For this example we are building a ceiling hosted family to be mounted to ceiling so we would start by choosing lighting fixture ceiling based as the template. Build the reflector and light source definition inside the host family, as shown below, under the ceiling host object.



Now we need to add our two mounting types in a way that they will be able to interchange with each other through the family types dialog. Open the oval mount family and click Load into Project. If more than one family is open it will prompt you to pick which family to load into. Choose the host family and click ok. Make sure to add the nested family in plan view and place as desired. It should place with the same position with respect to Ref. Level as it was built. This is how it should look now.



Click on the mount to highlight it. The Modify Generic Models toolbar will appear under the main one. Click on the label pull down and select add parameter. The parameter properties dialog will appear.



**Parameter Properties**

**Parameter Type**

☒ Family parameter  
(Cannot appear in schedules or tags)

☐ Shared parameter  
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)

Select... Export...

**Parameter Data**

Name:

Group parameter under:

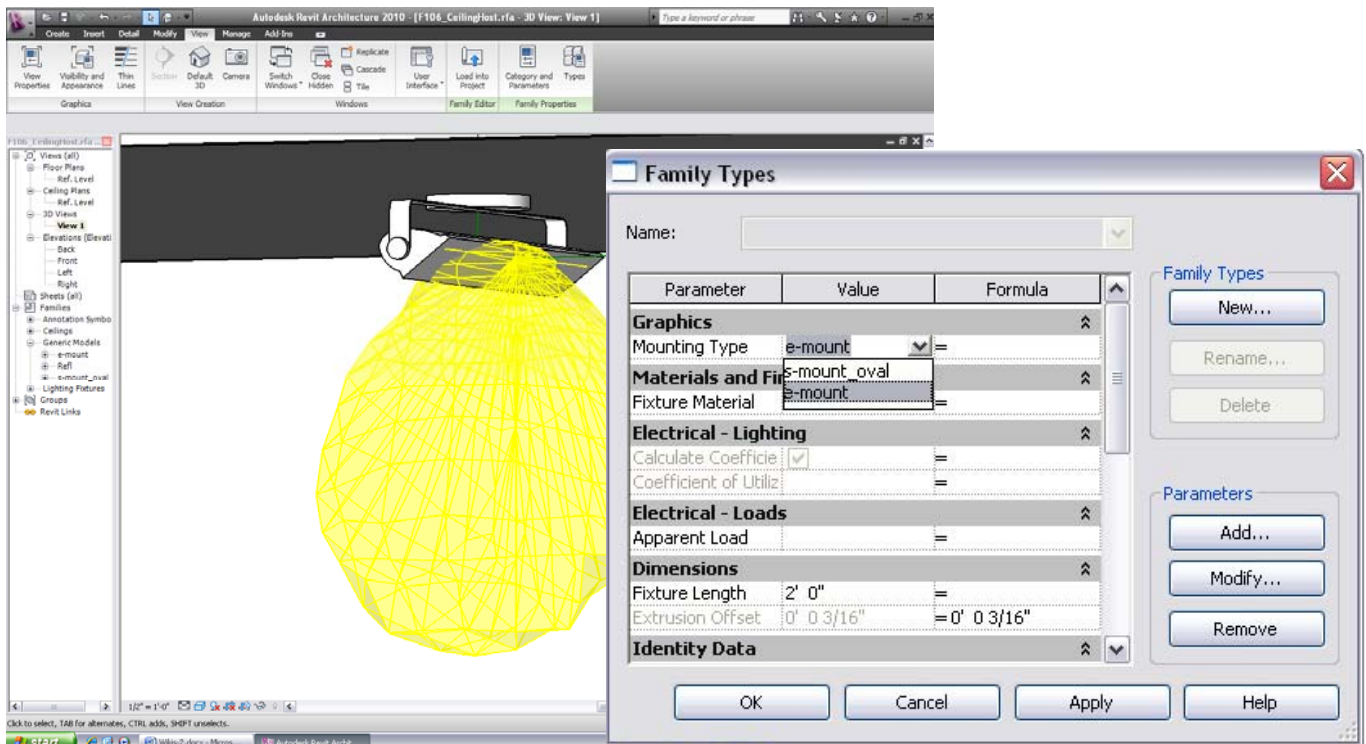
Discipline:  ☐ Instance ☒ Type

Type of Parameter:

OK Cancel Help

Notice the parameter type has been grayed out with Family type: Generic Model. This is the heart of this process. That parameter type is the one used for the interchange between nested components and it is associated to a certain category, in this case: Generic Models which is referenced from the mounting we clicked on. For this Case it will be called mounting type. Clicking ok will add this parameter to the types dialog as well as being assigned to the oval mount.

To be able to interchange this with the other yoke mount, first open the yoke mount family. Load it into the main host file. Do not place an instance. Simply hit escape. As long as it is of the same category as the other mount Revit will simply store the extra component for interchanging through the parameter that was just made. As long as the two mounting were built in the same position, if you go to the types dialog, find the parameter called mounting type. This kind of parameter will have a pull down with all of the nested components of the category it was set for. Here you will find the other mounting type you loaded. Choose that one instead and click ok. The yoke mount should now replace the oval mount and the job is done. Now when making family types one can modulate the mounting geometry as well as other parameter values



Hopefully this gives a good view at the possibilities of creating and sorting family types. For a more advanced approach about creating family types research or use Revit help to learn how to create and implement Type Catalogs.